IN THE CLAIMS

Please amend the claims as follows:

1. (Currently amended) A current sensor, comprising:

one middle leg magnetic circuit having opposite ends;

two outer leg magnetic circuits, each connected to one of the opposite ends of the middle leg magnetic circuit, respectively;

an exciting means arranged in each of the outer leg magnetic circuits ;

a flux detecting means[[(4)]] arranged in the middle leg magnetic circuit[[(1)]];

drive means for driving the exciting means; and

a detection circuit connected with the flux detecting means and outputting the electric signals interlocked with the flux being detected by the flux detecting means.

2. (Previously Presented) A current sensor according to claim 1, further comprising:

a balance recovery coil arranged by winding a wire around at least one of the middle leg magnetic circuit and the outer leg magnetic circuits;

a balance recovery current controlling circuit for controlling the balance recovery current run along the balance recovery coil to decrease the flux being detected by the flux detecting means, based on the electric signals being output from the detection circuit; and

a detected value outputting circuit for outputting the balance recovery current value.

3. (Previously Presented) A current detecting method, comprising:

achieving magnetic balance condition by generating a first excited flux which is an alternating flux to run along a middle leg magnetic circuit by an exciting means and generating a second excited flux, of which the magnitude is the same as that of the first excited flux and the direction is reverse to that of the first excited flux, the second flux being an alternating flux to run along the middle leg magnetic circuit by an exciting means;

achieving magnetic non-balance condition due to collapse of the magnetic balance condition, which is caused by running detected current along a detected wire passed through at least one of a window which is formed by being surrounded by a first outer leg magnetic circuit and the middle leg magnetic circuit and a window which is formed by being surrounded by a second outer leg magnetic circuit and the middle leg magnetic circuit to vary the magnetic reluctance of the first outer leg magnetic circuit and the second outer leg magnetic circuit; and

detecting the detected current running along the detected wire by detecting the flux which is generated along the middle leg magnetic circuit through achieving the magnetic non-balance condition, by a detection circuit outputting the electric signals interlocked with the flux being detected by a flux detecting means.

4. (Currently amended) A current detecting method, comprising:

achieving magnetic balance condition by generating a first excited flux which is an alternating flux to run along a middle leg magnetic circuit by an exciting means and

generating a second excited flux, of which the magnitude is the same as that of the first excited flux and the direction is reverse to that of the first excited flux, the second excited flux being an alternating flux to run along the middle leg magnetic circuit by an exciting means;

achieving magnetic non-balance condition due to collapse of the magnetic balance condition, which is caused by running detected current along a detected wire[[(6)]] passed through at least one of a window which is formed by being surrounded by a first outer leg magnetic circuit and the middle leg magnetic circuit and a window which is formed by being surrounded by a second outer leg magnetic circuit and the middle leg magnetic circuit to vary the magnetic reluctance of the first outer leg magnetic circuit and the second outer leg magnetic circuit;

achieving magnetic re-balance condition by running balance recovery current along a balance recovery coil to decrease the flux being generated along the middle leg magnetic circuit in the condition that magnetic reluctance of the first outer leg magnetic circuit and the second outer leg magnetic circuit is varied, wherein the balance recovery current, which generates the flux of which the magnitude is as same as that of the flux being generated along the magnetic circuit around which the detected wire is wound by being passed therethrough in the condition that the magnetic reluctance of the first outer leg magnetic circuit and the second outer leg magnetic circuit is varied and the direction is reverse to that of the said flux, is run along the balance recovery coil which is wound by being passed through the same window as the window through which the detected wire is passed; and

detecting the detected current running along the detected wire by detecting the balance recovery current running along the balance recovery coil in the magnetic re-balance condition.

5. (Previously Presented) A current sensor, comprising:

a first magnetic circuit having opposite ends;

second and third magnetic circuits each having opposite ends, wherein the respective one ends of the second and third magnetic circuits are connected with one end of the first magnetic circuit;

fourth and fifth magnetic circuits each having opposite ends, wherein the respective one ends of the fourth and fifth magnetic circuits are connected with the other end of the first magnetic circuit, and the other ends of the fourth and fifth magnetic circuits are connected with the second and third magnetic circuits, respectively;

a sixth magnetic circuit having opposite ends, wherein one and the other ends of the sixth magnetic circuit are connected with a contact between the second and fourth magnetic circuits and a contact between the third and fifth magnetic circuits, respectively;

an exciting means arranged to generate a flux along the sixth magnetic circuit;

a flux detecting means arranged to detect a flux of the first magnetic circuit;

a drive means for driving the exciting means; and

a detection circuit connected with the flux detecting means and outputting the electric signals interlocked with the flux being detected by the flux detecting means.

6. (Previously Presented) A current sensor according to claim 5, wherein, in the case that the exciting means is a coil, the coil is arranged to be passed at least one time through both of the window surrounded by the second and third magnetic circuits and the sixth magnetic circuit and the window surrounded by the fourth and fifth magnetic circuits and the sixth magnetic circuit.

7. (Previously Presented) A current sensor according to claim 5, wherein, in the case that the flux detecting means is a coil, the coil is arranged to be passed at least one time through both of the window surrounded by the second and fourth magnetic circuits and the first magnetic circuit and the window surrounded by the third and fifth magnetic circuits and the first magnetic circuit.

8. (Previously Presented) A current sensor according to claim 5, wherein the first magnetic circuit, the second and fifth magnetic circuits, the third and fourth magnetic circuits, the sixth magnetic circuit and the exciting means form a magnetic bridge.

9. (Previously Presented) A current sensor according to claim 5, further comprising:

a balance recovery coil arranged in any position in the magnetic bridge formed by the first magnetic circuit, the second and fifth magnetic circuits, the third and fourth magnetic circuits, the sixth magnetic circuit and the exciting means;

a balance recovery current controlling circuit for controlling the balance recovery

current run along the balance recovery coil to decrease the flux being detected by the flux detecting means, based on the electric signals being output from the detection circuit; and

a detected value outputting circuit for outputting the balance recovery current value.

10. (Previously Presented) A current detecting method, comprising:

achieving magnetic balance condition in which the flux by an exciting means is not present in a first magnetic circuit, by properly selecting the magnetic reluctance of second, third, fourth and fifth magnetic circuits to equalize magnetic potential of the opposite ends of the first magnetic circuit;

achieving magnetic non-balance condition due to collapse of the magnetic balance condition, which is caused by running detected current along a detected wire passed through at least one of the window surrounded by the first, second and fourth magnetic circuits and the window surrounded by the first, third and fifth magnetic circuits to vary the magnetic reluctance of at least one of the second, third, fourth and fifth magnetic circuits; and

detecting the detected current running along the detected wire by detecting a flux which is generated along the first magnetic circuit through achieving the magnetic non-balance condition, by a detection circuit outputting the electric signals interlocked with the flux being detected by a flux detecting means.

11. (Previously Presented) A current detecting method, comprising:

achieving magnetic re-balance condition by running balance recovery current along a balance recovery coil to return to the magnetic reluctance prior to variation the varied magnetic reluctance of the magnetic circuit of which the magnetic reluctance is varied and thus decrease a flux being generated along a first magnetic circuit in the condition that the magnetic reluctance of at least one of second, third, fourth and fifth magnetic circuits is varied, wherein the balance recovery current, which generates a first flux of which the magnitude is as same as that of a second flux being generated along the magnetic circuit around which a detected wire is wound by being passed therethrough in the condition that the magnetic reluctance of at least one of the second, third, fourth and fifth magnetic circuits is varied and the direction is reverse to that of the second flux, is run along the balance recovery coil which is wound by being passed through the same window as the window through which the detected wire is passed; and

detecting the detected current running along the detected wire by detecting the balance recovery current running along the balance recovery coil in the magnetic re-balance condition.

12. (Previously Presented) A magnetic bridge, comprising:

one middle leg magnetic circuit having opposite ends;

first and second outer leg magnetic circuits each connected to one of the opposite ends of the middle leg magnetic circuit, respectively;

a first exciting means arranged in the first outer leg magnetic circuit and a second exciting means arranged in the second outer leg magnetic circuit;

a flux detecting means arranged in the middle leg magnetic circuit; and

drive means for driving each of the exciting means;

wherein the magnetic bridge achieves magnetic balance condition by generating a first excited flux which is an alternating flux to run along the middle leg magnetic circuit by the first exciting means and generating a second excited flux, of which the magnitude is as same as that of the first excited flux and the direction is reverse to that of the first excited flux, which is an alternating flux to run along the middle leg magnetic circuit by the second exciting means.

13. (Currently amended) A magnetic bridge, comprising:

a first magnetic circuit having opposite ends;

second and third magnetic circuits having opposite ends, wherein the respective one ends of the second and third magnetic circuits are connected with one end of the first magnetic circuit;

fourth and fifth magnetic circuits having opposite ends, wherein the respective one ends of the fourth and fifth magnetic circuits are connected with the other end of the first magnetic circuit, and the other ends of the fourth and fifth magnetic circuits are connected with the second and third magnetic circuits, respectively;

a sixth magnetic circuit having opposite ends, wherein one and the other ends of the sixth magnetic circuit are connected with a contact between the second and fourth magnetic circuits and a contact between the third and fifth magnetic circuits, respectively;

an exciting means arranged to generate a flux along the sixth magnetic circuit;

a flux detecting means arranged to detect the flux of the first magnetic circuit; and

a drive means for driving the exciting means;

wherein the magnetic bridge achieves magnetic balance condition in which the flux by the exciting means is not present in the first magnetic circuit, by properly selecting the magnetic reluctance of the second, third, fourth and fifth magnetic circuits to equalize magnetic potential of the opposite ends of the first magnetic circuit[[(1)]].

14. (Previously Presented) A magnetic bridge, comprising:

first and second magnetic circuits having opposite ends, wherein one ends of the first and second magnetic circuits are connected;

third and fourth magnetic circuits having opposite ends, wherein one ends of the third and fourth magnetic circuits are connected, and the other ends of the third and fourth magnetic circuits are connected with the first and second magnetic circuits, respectively;

a fifth magnetic circuit having opposite ends, wherein one and the other ends of the fifth magnetic circuit are connected with a contact between the first and third magnetic circuits and a contact between the second and fourth magnetic circuits, respectively;

an exciting means arranged to generate a flux along the fifth magnetic circuit; and

a drive means for driving the exciting means;

wherein the magnetic bridge achieves magnetic balance condition in which magnetic potential of the contact between the first and second magnetic circuits and the contact

between the third and fourth magnetic circuits is equalized by properly selecting the magnetic reluctance of the first, second, third and fourth magnetic circuits.